

Quarkonium production in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV with ALICE

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The ultra-relativistic heavy-ion collisions at the Large Hadron Collider provide an unique opportunity to study the properties of matter at extreme energy densities where a phase transition of the hadronic matter to a deconfined medium of quarks and gluons, the Quark-Gluon Plasma (QGP) is predicted. Considerable theoretical and experimental efforts have been invested in the last 30 years to study the properties of the QGP.

Among the prominent probes of the QGP, heavy quarks play a crucial role since they are created during the initial stages of the collision, before the QGP formation, and their number is conserved throughout the partonic and hadronic phases of the collision. The sequential suppression of the quarkonium states was suggested as a signature of the QGP. Later, a regeneration of quarkonia by recombination of deconfined quarks was also predicted. The first results on quarkonium suppression in Pb-Pb collisions at the LHC seem to indicate that for charmonia both regeneration and suppression mechanisms play a role, while for bottomonia the regeneration mechanism should be small.

The momentum space azimuthal anisotropy of charmonium production, quantified using the second harmonic Fourier coefficient (referred as elliptic flow), provides important information on the magnitude and dynamics of charmonium suppression and regeneration mechanisms, both of them thought to be at their highest level at LHC energies.

ALICE measures quarkonia at mid-rapidity in the dielectron decay channel and at forward rapidity in the dimuon one, both down to zero transverse momentum. Single- and multi-differential measurements of quarkonium nuclear modification factor at forward rapidity and J/ψ elliptic flow in Pb-Pb collisions (both at forward and mid-rapidity) at $\sqrt{s_{NN}} = 5.02$ TeV as a function of centrality, transverse momentum and rapidity will be presented, with largely increased statistics compared to $\sqrt{s_{NN}} = 2.76$ TeV. Comparisons to measurements at different collision energies and available theoretical calculations will be discussed.

List of tracks

Heavy-flavour (open and hidden)

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